In The Claims (*Newly Added Claims*)

Please add the following new claims:

13. (New) The method according to claim 1, wherein the RC in d) is set to 1.0 in the calculation of the synthetic traces.

14. (New) The method according to claim 1, wherein the same weights $w_i(\vec{x})$ in the PSDM in a) are used in the local PSDM in e).

15. (New) The method according to claim 1, wherein "square" method or "norm" method is used for measuring the amplitudes in f).

16. (New) The method according to claim 1, wherein the process in a)-f) is repeated for points along the target reflector to create a map of the RC for the target reflector.

17. (New) The method according to claim 1, wherein the synthetic traces in c) are computed by ray tracing.

18. (New) The computer program according to claim 7, wherein the RC in d) is set to 1.0 in the calculation of the synthetic traces.

19. (New) The computer program, according to claim 7, wherein the weights $w_i(\vec{x})$ in the PSDM in a) are used in the local PSDM in e).

In The Claims (*Newly Added Claims, Cont'd*)

20. (New) The computer program according to claim 7, wherein the "square" method or "norm" method is used for measuring the amplitudes in f).

21. (New) The computer program according to claim 7, wherein the process in a)-f) is repeated for points along the target reflector to make a map of the RC for the target reflector.

22. (New) The computer program according to claim 7, wherein the synthetic traces in c) are computed by ray tracing.

23. (New) A data set representing the Reflection Coefficient (RC) of subsurface reflectors produced by

a) migrating to depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), using shot/receiver pairs, thereby achieving a real depth migrated seismic cube $P_{Obs}(\vec{x})$ which is a function of the recorded traces that have each been given a weight $w_i(\vec{x})$;

b) interpreting $P_{Obs}(\vec{x})$ to find the spatial positions of the reflectors in the subsurface, and based on these reflectors and the seismic velocities, a depth model is established in the computer, and one of the reflectors in the depth model is chosen to be the target reflector;

c) computing synthetic traces from the target reflector for all shot/receiver pairs in the survey that was used in a);

d) setting the RC of the target reflector in the depth model to an essentially constant value when the synthetic traces are computed;

e) doing a local PSDM of the synthetic traces in a band around the target reflector to obtain a modeled PSDM cube $P_{Mod}(\vec{x})$; and

f) measuring the amplitudes along the target reflector on the real PSDM cube $P_{Obs}(\vec{x})$, and dividing these measurements by the corresponding measurements from the modeled PSDM cube $P_{Mod}(\vec{x})$, to thereby obtain an estimate of the angle dependent RC with corresponding reflection angle and weight function.

24. (New) The data set according to claim 23, wherein RC in d) is set to 1.0 in the calculation of the synthetic traces.

25. (New) The data set according to claim 23, wherein the same weights $w_i(\vec{x})$ in the PSDM in a) are used in the local PSDM in e).

26. (New) The data set according to claim 23, wherein "square" method or "norm" method is used for measuring the amplitudes in f).

27. (New) The data set according to claim 23, wherein the process in a)-f) is repeated for points along the target reflector to create a map of the RC for the target reflector.

28. (New) The data set according to claim 23, wherein the synthetic traces in c) are computed by ray tracing.

29. (New) A map produced by multidimensional plotting of the data set according to claim 23.

1. Method for finding the Reflection Coefficient (RC) of reflectors in the subsurface of the ground, said method comprising:

a) migrating to depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), using shot/receiver pairs, thereby achieving a real depth migrated seismic cube $P_{Obs}(\vec{x})$ which is a function of the recorded traces that have each been given a weight $w_i(\vec{x})$;

b) interpreting $P_{Obs}(\vec{x})$ to find the spatial positions of the reflectors in the subsurface, and based on these reflectors and the seismic velocities, a depth model is established in the computer, and one of the reflectors in the depth model is chosen to be the target reflector;

c) computing synthetic traces from the target reflector for all shot/receiver pairs in the survey that was used in a);

d) setting the RC of the target reflector in the depth model to an essentially constant value when the synthetic traces are computed;

e) doing a local PSDM of the synthetic traces in a band around the target reflector to obtain a modeled PSDM cube $P_{Mod}(\vec{x})$; and

f) measuring the amplitudes along target reflector on the real PSDM cube $P_{Obs}(\vec{x})$, dividing these measurements by the corresponding measurements from the modeled PSDM cube $P_{Mod}(\vec{x})$, thereby obtaining an estimate of the angle dependent RC with corresponding reflection angle and weight function.

7. An article of manufacture comprising:

- a computer usable medium having computer readable program code embodied therein for finding the Reflection Coefficient (RC) of reflectors in the subsurface, the computer readable program code in said article of manufacture comprising:

a) computer program means for enabling a computer to determine depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), using shot/receiver pairs, thereby achieving a real depth migrated seismic cube ($P_{Obs}(\vec{x})$) which is a function of the recorded traces that each has been given a weight $w_i(\vec{x})$;

b) said computer program means including means for enabling a computer to interpret $P_{Obs}(\vec{x})$ to find the spatial positions of reflectors in the subsurface, and based on these reflectors and the seismic velocities a depth model is established in the computer, and one of the reflectors in the depth model is chosen to be the target reflector;

c) said computer program means including means for enabling a computer to compute synthetic traces from the target reflector from all shot/receiver pairs in the survey that was used in a);

d) said computer program means including means for enabling a computer to set the RC of the target reflector in the depth model to an essentially constant value when the synthetic traces are computed;

e) said computer program means including means for enabling a computer to perform a local PSDM of the synthetic traces in a band around the target reflector to obtain a modeled PSDM cube $P_{Mod}(\vec{x})$; and

(f) said computer program means including means for enabling a computer to measure the amplitudes along target reflector on the real PSDM cube $P_{Obs}(\vec{x})$, dividing these measurements with the corresponding measurements from the modeled PSDM cube $P_{Mod}(\vec{x})$, obtaining an estimate of the angle dependent RC with corresponding reflection angle and weight function.

13. The method according to claim 1, wherein the RC in d) is set to 1.0 in the calculation of the synthetic traces.

14. The method according to claim 1, wherein the same weights $w_i(\vec{x})$ in the PSDM in a) are used in the local PSDM in e).

15. The method according to claim 1, wherein "square" method or "norm" method is used for measuring the amplitudes in f).

A3 Cont'd

16. The method according to claim 1, wherein the process in a)-f) is repeated for points along the target reflector to create a map of the RC for the target reflector.

17. The method according to claim 1, wherein the synthetic traces in c) are computed by ray tracing.

18. The computer program according to claim 7, wherein the RC in d) is set to 1.0 in the calculation of the synthetic traces.

19. The computer program, according to claim 7, wherein the weights $w_i(\vec{x})$ in the PSDM in a) are used in the local PSDM in e).

20. The computer program according to claim 7, wherein the "square" method or "norm" method is used for measuring the amplitudes in f).

21. The computer program according to claim 7, wherein the process in a)-f) is repeated for points along the target reflector to make a map of the RC for the target reflector.

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22. The computer program according to claim 7, wherein the synthetic traces in c) are computed by ray tracing.

23. A data set representing the Reflection Coefficient (RC) of subsurface reflectors produced by

a) migrating to depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), using shot/receiver pairs, thereby achieving a real depth migrated seismic cube $P_{Obs}(\vec{x})$ which is a function of the recorded traces that have each been given a weight $w_i(\vec{x})$;

b) interpreting $P_{Obs}(\vec{x})$ to find the spatial positions of the reflectors in the subsurface, and based on these reflectors and the seismic velocities, a depth model is established in the computer, and one of the reflectors in the depth model is chosen to be the target reflector;

c) computing synthetic traces from the target reflector for all shot/receiver pairs in the survey that was used in a);

d) setting the RC of the target reflector in the depth model to an essentially constant value when the synthetic traces are computed;

e) doing a local PSDM of the synthetic traces in a band around the target reflector to obtain a modeled PSDM cube $P_{Mod}(\vec{x})$; and

f) measuring the amplitudes along the target reflector on the real PSDM cube $P_{Obs}(\vec{x})$, and dividing these measurements by the corresponding measurements from the modeled PSDM cube $P_{Mod}(\vec{x})$, to thereby obtain an estimate of the angle dependent RC with corresponding reflection angle and weight function.

24. The data set according to claim 23, wherein RC in d) is set to 1.0 in the calculation of the synthetic traces.

25. The data set according to claim 23, wherein the same weights $w_i(\vec{x})$ in the PSDM in a) are used in the local PSDM in e).

26. The data set according to claim 23, wherein "square" method or "norm" method is used for measuring the amplitudes in f).

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27. The data set according to claim 23, wherein the process in a)-f) is repeated for points along the target reflector to create a map of the RC for the target reflector.

28. The data set according to claim 23, wherein the synthetic traces in c) are computed by ray tracing.

29. A map produced by multidimensional plotting of the data set according to claim 23.